Claims

1. A circuit arrangement, for generating an x-ray tube voltage, comprising:

an inverse rectifier circuit (G_{si}) for generating a high-frequency alternating voltage,

a high-voltage generator (G_{su}) for converting the high-frequency alternating voltage into a high voltage for the x-ray tube ,

a voltage controller (G_{RU}), which based on a deviation of an x-ray tube voltage ($V_U(t)$) from a set-point x-ray tube voltage ($W_{U(t)}$) generates a first controlling variable value ($Y_{U(t)}$)for the inverse rectifier circuit (G_{si}),

a measurement circuit for measuring an oscillating current ($i_{sw(t)}$) applied to one output of the inverse rectifier circuit (G_{si}) of the high-frequency alternating voltage,

an oscillating current controller (G_{RI}), which based on a deviation of an ascertained actual oscillating current value ($V_I(t)$) from a predetermined maximum oscillating current value (W_{I_max}) generates a second controlling variable value ($Y_{I(t)}$) for the inverse rectifier circuit (G_{si}), and wherein

a switching device, connected downstream of the voltage controller (G_{RU}) and the oscillating current controller(G_{RI}), operable to compare the first controlling variable value ($Y_{U(t)}$)and the second controlling variable value ($Y_{I(t)}$) and is operable to send the lesser of the first and second controlling variable values ($Y_{U(t)}$ and $Y_{I(t)}$) onward as a resultant controlling variable value ($Y(t)$) to the inverse rectifier circuit (G_{si}).

2. The circuit arrangement as of claim 1, wherein at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) includes a PI controller.

3. The circuit arrangement as of claim 1, wherein one output of the switching device is connected to at least one of the voltage controller (G_{RU}) and of the oscillating current controller (G_{RI}); and that the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) are such the resultant controlling variable value ($Y(t)$)is carried along, if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

4. The circuit arrangement as of claim 2, wherein one output of the switching device is connected to at least one of the voltage controller (G_{RU}) and of the oscillating current controller (G_{RI}); and that the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) are such the resultant controlling variable value ($Y(t)$)is carried along, if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

5. The circuit arrangement as of claim 1, wherein the switching device is such that no controlling variable lower than a predetermined minimum controlling variable value (Y_{min}) is sent onward as the resultant controlling variable value ($Y(t)$)to the inverse rectifier circuit

(G_{si}).

6. The circuit arrangement as of claim 4, wherein the switching device is such that no controlling variable lower than a predetermined minimum controlling variable value (Y_{min}) is sent onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}).

7. The circuit arrangement as of claim 1, wherein switching device is such that no controlling variable higher than a predetermined maximum controlling variable value (Y_{min}) is send onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}).

8. The circuit arrangement as of claim 6, wherein switching device is such that no controlling variable higher than a predetermined maximum controlling variable value (Y_{min}) is send onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}).

9. The circuit arrangement as of claim 1, wherein at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}) can vary at least one parameter, the at least one parameter being a function of at least one of a set x-ray tube voltage ($U_{Rö}$) and a set x-ray tube current ($I_{Rö}$).

10. An x-ray generator having a circuit arrangement of claims 1.

11. An x-ray generator having a circuit arrangement of claim 8.

12. An x-ray system having an x-ray generator of claim 10.

13. A method for generating an x-ray tube voltage where a high-frequency alternating voltage is generated via
an inverse rectifier circuit (G_{si}), the high-frequency alternating voltage is converted into a high voltage for the x-ray tube v a high-voltage generator (G_{su}), and a first controlling variable value($Y_{U(t)}$) is generated for the inverse rectifier circuit (G_{si})via a voltage controller (G_{RU}) due to a deviation of an x-ray tube voltage ($V_U(t)$) from a set-point x-ray tube voltage ($W_{U(t)}$), the method comprising:

measuring an oscillating current ($i_{sw(t)}$) via a measurement circuit that is connected to one output of the inverse rectifier circuit (G_{si}) of the high-frequency alternating voltage,

generating a second controlling variable value ($Y_{I(t)}$) for the inverse rectifier circuit (G_{si}) via an oscillating current controller (G_{RI}), due to a deviation of an ascertained actual oscillating current value ($V_I(t)$) from a predetermined maximum oscillating current value (W_{I_max}),

comparing the first controlling variable value ($Y_{U(t)}$)and the second controlling variable value ($Y_{I(t)}$) via a switching device, the switching device being connected downstream of the voltage controller (G_{RU}) and the oscillating current controller(G_{RI}), and

sending the lesser of the first and second controlling variable values ($Y_{U(t)}$ and $Y_{I(t)}$) onward as a

resultant controlling variable value (Y(t)) to the inverse rectifier circuit (G_{si}).

14. The method as of claim 13, further comprising using a PI controller in at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}).

15. The method as of claim 13, further comprising feeding back the resultant controlling variable value (Y(t)) as an input value to at least one of the voltage controller (G_{RU}) and/or to the oscillating current controller (G_{RI}), and carrying along the resultant controlling variable value (Y(t)), if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value (Y(t)).

16. The method as of claim 14, further comprising feeding back the resultant controlling variable value (Y(t)) as an input value to at least one of the voltage controller (G_{RU}) and to the oscillating current controller (G_{RI}), and carrying along the resultant controlling variable value (Y(t)), if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value (Y(t)).

17. The method as of claim 13, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not lower than a predetermined minimum controlling variable value (Y_{min}).

18. The method as of claim 14, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not lower than a predetermined minimum controlling variable value (Y_{min}).

19. The method as of claim 13, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not higher than a predetermined maximum controlling variable value (Y_{max}.

20. The method as of claim 14, further comprising sending onward as the resultant controlling variable value (Y(t))to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not higher than a predetermined maximum controlling variable value (Y_{max}.

21. The method as of claim 12, further comprising varying at least one parameter within at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}), the at least one parameter being a function of at least one of a set x-ray tube voltage ($U_{Rö}$) and a set x-ray tube current ($I_{Rö}$).

22. The method as of claim 14, further comprising varying at least one parameter within at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}), the at least one parameter being a function of at least one of a set x-ray tube voltage ($U_{Rö}$) or a set x-ray tube current ($I_{Rö}$).